High Density Deployments Using Weblogic Multitenancy

Jakob Poot
AMIS Services B.V.
Nieuwegein, the Netherlands

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Introduction

Weblogic Server 12c R2 brings new capabilities for organizations to consolidate and provide high density deployments in their environments.
Weblogic Multitenancy was first introduced in version 12.2.1. Multitenancy provides an easy way to create secure, isolated and efficient domain partitions. Separation of customers using the same application can be accomplished by deploying multiple times to separate partitions. Sharing the same JVM resources, while keeping them totally isolated from each other. Implement maximum portability between environments for leveraging DevOps.
Besides consolidation, isolation and optimization on premises, the partitions enable easy movement from private to public cloud and vice versa.

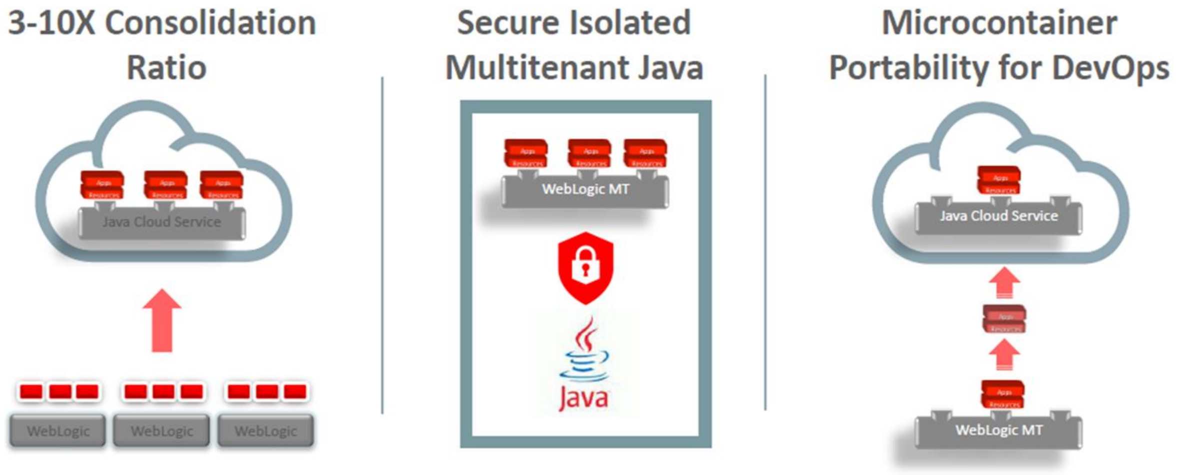
3-10X Consolidation Ratio
Java Cloud Service
WebLogic
WebLogic
WebLogic
Secure Isolated Multitenant Java
WebLogic MT
Java
Microcontainer Portability for DevOps
Java Cloud Service
WebLogic MT

Illustration. 1: Key pillars of WebLogic Multitenancy

Key Concepts and components of Weblogic Multitenancy

The key components of Weblogic Multitenancy are:

Tenants The separate users, organisations, groups, departments that use resource in a Weblogic domain

Domain partition	A separate, isolated portion of a Weblogic domain that has its own runtime within a Java Virtual Machine.
Resource Groups	A group of related deployable resources, like applications, libraries, JMS, data sources, ...
Resource Group Template	A template with al predefined deployable resources from which several Resource groups can be referenced. This is especially useful for multiple deployments of the same application.
Virtual Targets	Provide the location of the partition and takes care of routing the traffic to the resource groups within the partition or domain.
Deployment Scope	Deploy applications globally, by resource group template or resource group in a partition or domain.
Oracle Traffic Director	Provides loadbalancing for the Virtual targets and can be connected to a WebLogic Multitenancy partition. (Optional) The use of Oracle Traffic Director is part of the WebLogic Multitenancy license.

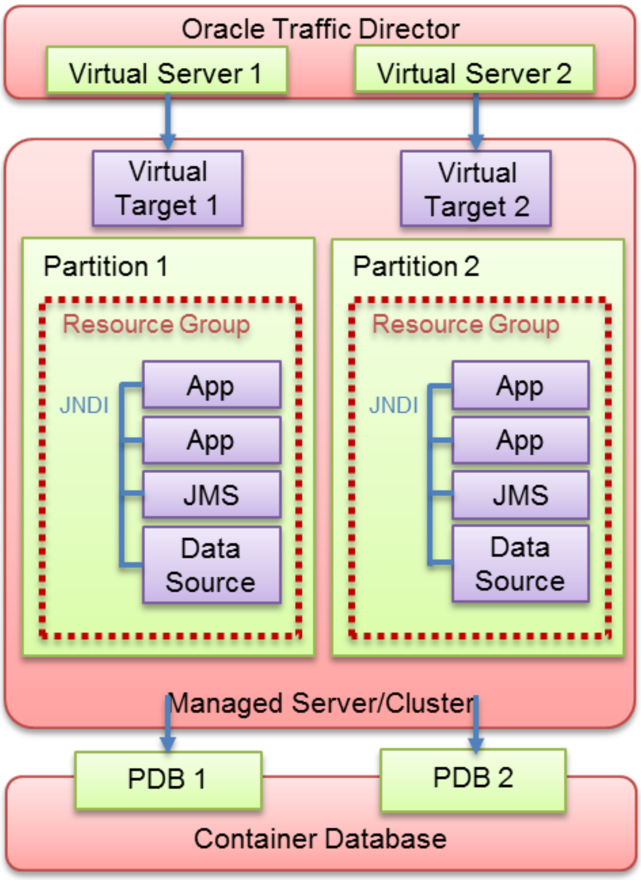

Illustration. 2: Overview of a Weblogic Multitenancy environment

Consolidation

Consolidation is the first of the three pillars that the Multitenancy option is built on. The costs of maintaining hundreds to thousands of domains can be decreases by a 3-10X with this option. By moving dedicated domains into multitenant domains, there is less administration and need for hardware (or VM's), Operating systems, JVM's and overhead for all the domains. This also makes sure of optimal use of available resources. And all of this with no increase in response times. (According to Oracle)

Isolation

When providing an environment where multiple tenants are using the same JVM, you want to make sure that the tenants are securely isolated. Each can be administered separately so deployments can be down independent for each resource. This is accompliced by memory and CPU isolation at the JVM level. This functionality was first build into the Oracle JDK 8 update 40 and can be managed using Resource Consumption Management (RCM). RCM provides the ability to manage resources like open files, Heap usage and cpu utilization used by a partition. This prevent applications from negatively affecting each other. What's known as the noisy neighbour. Should a neighbour become to noise, RCM has the possibility to take action on this. For instance, slow, fail, stop or restart a partition.

Portability for DevOps

Perhaps one of the most interesting features om WebLogic Multitenancy are the possibilities it brings for transitioning applications from development to production environments. Partitions can be moved through all stages without any changes to the applications. This is done by container like packaging and even loadbalancer integration.
Exporting and importing partitions provides an easy way to move partitions, not only from development to production, but also from on-premise to the Oracle Public Cloud.

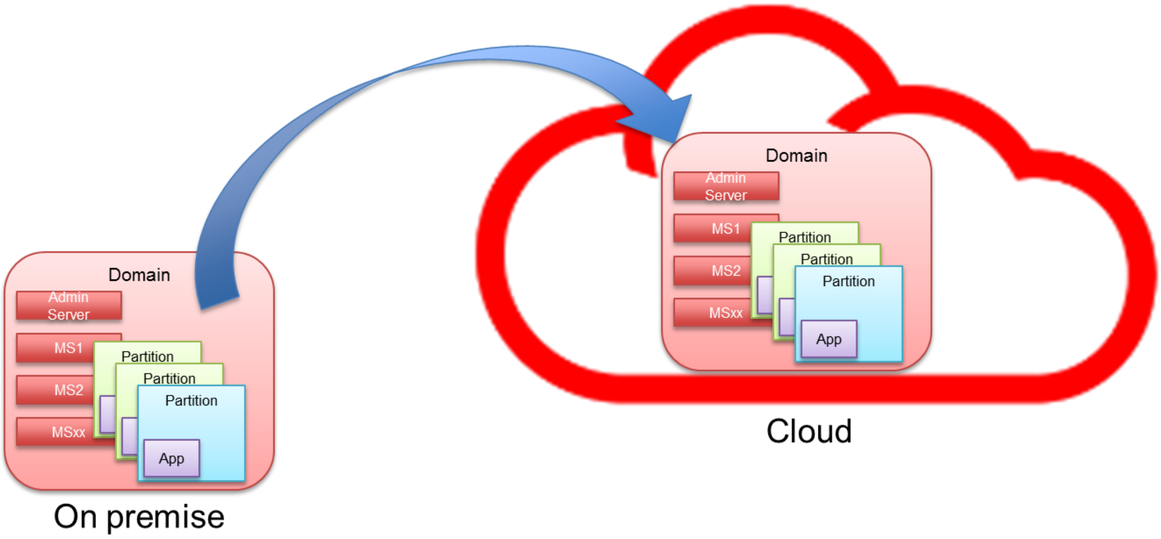

Illustration. 3: Moving to the Oracle Cloud

Java Cloud Service

The Oracle Java Cloud Service (JCS) now fully supports the Multitenancy functionality of WebLogic. As of a couple of months ago you can create a JCS instance which include domain partitions. During Oracle Open World a new function, App2Cloud, is also introduced which allows you to create a JCS instance from an on-premise domain. This makes transitioning to the Cloud very easy.

Migration to WebLogic Multitenancy

Migration existing domains to domain partitions can be done in several different ways.
- Using the Domain to Partition Conversion Tool (DPCT)
DPCT creates an export of an existing domain in an archive file. This archive can be used as input for the import Domain function. Specific attributes can be overridden by se of a json file.
DPCT support WebLogic version 10.3.6 or higher

- Using Enterprise Manager Cloud Control 13c
EM13c can manage both on-premise and Cloud domains. Functionality is provided to migrate domains to and from the Cloud. Benefit here is that no manual file transfers are needed.

- Using App2Cloud
App2Cloud can create a JCS instance with partition from an on-premise domain. As with DPCT, the App2Cloud creates an archive which is used to create a domain partition in the JCS instance.

Managing WebLogic Multitenancy

WebLogic Multitenancy can be fully managed using Fusion Middleware Control, WebLogic Console, WLST and REST from the domain. And remote using EM13c.

Contact address:

Jakob Poot
AMIS Services B.V
Edisonbaan 15
3439 MN Nieuwegein
The Netherlands

Phone:	+31 (0)6-30541315
Email	jaap.poot@amis.nl
Internet:	http://www.amis.nl
Blog:	http://technlogy.amis.nl
Twitter:	http://twitter.com/jpoot71